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MODELING MANAGEMENT INFORMATION SYSTEM AT DISDIKPORA KARAWANG SCHOLARSHIP

Lila Setiyani*), Evelyn Tjandra, Tutut Sumartini
Information System Study Program, STMIK Rosma
Karawang Literature Study Program, Universitas Pamulang
**Email: lila.setiyani@dosen.rosma.ac.id , evelyn.tjandra@mhs.rosma.ac.id, tututsumartini2003@yahoo.com*

ABSTRACT
Scholarship from Disdikpora Program attracts lots of attention from students. Due to many problems encounters at the operational process of managing the scholarship which is still done conventionally. The impacts of the slow decision-making process on the selection caused dissatisfaction. The purpose of this study is to propose to Disdikpora a scholarship management information system modeling to improve the effectiveness and efficiency of the service and decision making. The methodology used is the Unified Modeling Language (UML) which is a set of structures and techniques for modeling Object-Oriented Programming (OOP). The result of this research is a scholarship management information system that can be used by the Disdikpora in the management of district-level college scholarship.

Keywords: scholarship, management information system, Object-Oriented Programming (OOP)

1. INTRODUCTION

The Karawang Department of Youth and Sports Education (Disdikpora) is an organization that implements regional autonomy in the education field. It has the main task of assisting the Regent in implementing some of the regional authorities in the education field in particular for youth and sports (Disdikpora, 2019)[2]. The scholarship program aims at supporting education funding for students who are currently studying at the universities. Scholarships are financial assistance provided for students to alleviate the burden of education costs (Darmawan, 2012)[1]. The requirement to be able to participate in the Disdikpora scholarship is to have good performance or achievements in education. This program gets much attention from the people around Karawang. This is caused by many problems in the operational processes such as the opening, registration, selection, and announcement of scholarship processes. Many people are disappointed because of the difficulty of the registration process, the lack of transparency in the selection process, the slow decision- making related to selection makes the community's distrust of Disdikpora. The process is done using conventional methods that have the potential of losing data. Seeing the description of the problems, it seems that Disdikpora needs an information system that can help them to manage the scholarship selection operation process so that the management becomes more effective and efficient. Carl Mernewik (2016) (Marnewick, 2016)[6] reveals that "the use of information systems can provide benefits in managing operational processes and can increase the realization of benefits for the organization in a sustainable manner". Safitri and Supriyadi argues "that the information system applied to an organization can change operational processes to be more effective and efficient and encourage better management" (Safitri & Supriyadi, 2015)[11] Therefore, this study aims to make a modeling of the Karawang Disdikpora scholarship management information system, therefore the operational management process of the scholarship can be more effective and efficient.

The results of this study can be implemented by Karawang Disdikpora to manage registration, transparency of selection and acceleration in decision making for

scholarship selection. The effectiveness of this system can be seen from the accuracy in the selection of Disdikpora scholarship recipients. While the efficiency of this system can be seen from the speed, ease of registration and transparency of the selection process for Disdikpora scholarship recipients. The design of this application can be a differentiator for Disdikpora Karawang because there have been improvements to business processes. Other Disdikpora in Indonesia can follow this model to increase transparency in the selection process.

2. LITERATURE REVIEW

Scott in (Kirom, Bilfaqih, & Effendie, 2012)[5] argues that management information systems are a series of integrated rational subsystems that can transform data so that it becomes information through a series of ways to increase productivity by the style and nature of managers based on predetermined quality criteria. Abdul Kadir (2006) explains that the management information system has four functions, namely searching for data, managing data into information, informing data to users and storing data. Some literature reviews about the design of scholarship information systems including research conducted by Nuraida et.al (2016) designing scholarship information systems for the Untirta engineering faculty, designing this system using data flow diagram (DFD) analysis (Nuraida, Hadi, & Rachmat, 2016)[8]. Eniyati (2011) also conducted a research on the design of a decision support system for receiving scholarships using the Simple Additive Weighting (SAW) method. This study was appointed to find alternative scholarship criteria established using the SAW method (Eniyati, 2011)[3]. Meanwhile Umami et.al also conducted research related to scholarship-granting, but focused on discussing the decision support system for Bidik Misi scholarship using the SAW method (Umami, Abdillah, & Yadi, 2014)[13].

Seeing several other studies that have revealed the design of information systems related to scholarship management, the differentiator of this research is the modeling of this information system by using the Object-Oriented Programming (OOP) methodology combined with data flow diagram flow. This modeling has begun with determining the needs of scholarship management information systems. Information system requirements in the model of software development processes or information systems function to provide a clear description of the specifications of software products or information systems needed by stakeholders (Gómez Sotelo, Baron, Esteban, Estrada, & Laredo Velázquez, 2018)[4]. The determination of functional requirements is the result of product specification validation from stakeholders so that an effective product is obtained. Classification of requirements in the software development process model according to Glinz (2005), Badreau et al. (2014) and Mabrok et al. (2015) in (Gómez Sotelo et al., 2018)[4] divides into two namely functional requirements that describe the functionality of the system to be developed (this functionality is expectations of solutions desired by stakeholders) and non-functional requirements which are property specifications used to operate the system. Some writers such as (Romadhoni, Widiyaningtyas, & Pujianto, 2015)[10], (Novrizal Eka Saputra, Ken Ditha Tania, 2016)[7], (Salman, Manalu, Chandra, & Gomis, 2015)[12] say that saying that the practice used to get stakeholder needs is techniques or methods such as interviews, questionnaires, observations, etc. Each of these techniques or methods has advantages and disadvantages. The selection of this method can be adjusted based on stakeholder conditions.

Based on the results of data collection from stakeholders as known as the Karawang Disdikpora and students who register for the scholarship are determined the functional needs of the Karawang Disdikpora scholarship management information system. Determination of the functional requirements of the Karawang Disdikpora scholarship management information system guides researchers in making the modeling of this system. OOP is a design pattern intended to describe one or more behaviors between users and systems (Riehle, 2015)[9]. In the OOP model, several models are drawn, i.e. use case, activity diagrams, sequence diagrams, class

diagrams. However, in this study only modeled for use case and class diagrams. Use case diagram provides an overview of menus that can be accessed by system users. The activity diagram provides an overview of activities or procedures that must be passed by the user in operating the system. Class Diagram provides an overview of the relationships between tables in a system database. While the data flow diagram (DFD) is a design pattern that describes the flow of documents that occur between the user and the system (Veza, 2017)[14]. In the data flow model, the graph describes the flow of documents that occur between the user and the system. Document flow can go through several processes. Therefore, in the data flow model, there is a level of the process. The higher the level, the more complicated the system will be. These two design patterns were chosen to provide a comprehensive picture in developing the management information system for the Karawang Disdikpora scholarship management system. In addition to the two DFD and OOP modeling, researchers also carried out modeling for the design of inputs and outputs from the Disdikpora scholarship information system. The input design provides an overview of the form for entering data. While the output design provides an overview related to the display of data or reports obtained from the data processing that has been input. This input and output design helps programmers provide direction to make the Disdikpora scholarship information system display.

3. DATA AND RESEARCH TECHNIQUE ANALISYS

The design pattern of the Disdikpora Karawang scholarship management information system, through several procedures, can be described as **Figure 1.** The research begins with the process of compiling a matrix and data collection instruments that guide researchers in the process of extracting data from stakeholders in the management information system of the Karawang Disdikpora scholarship.

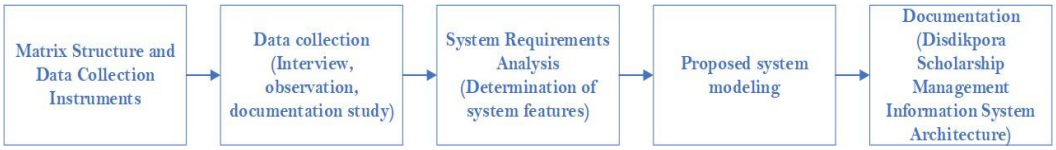

Figure 1. Research Procedure

Data sources were taken from Karawang Diskdikpora scholarship management staff and students who have experience registering Disdikpora scholarships. The results of data collection are processed to determine the functional requirements of the system or features required in the Karawang Disdikpora scholarship management information system. Based on the determination of these features, researchers create design patterns using OOP and DFD methodologies. OOP design patterns are described using use case diagram, class diagrams and system mockups. Whereas DFD design patterns are described using context-level DFD. The results of the design pattern are then documented and submitted to the Karawang Disdikpora as a material consideration in developing a scholarship management information system.

4. RESULT AND DISCUSSION

System Requirements Analysis

The results of the analysis of the Karawang Disdikpora scholarship operational process that is currently running, there are three activities, namely the scholarship registration process, scholarship selection and scholarship selection results. Identification of problems from the scholarship operational process is:

1. There is no database as data storage
2. File archiving is done manually through piles - registers of files, so that the files fill the file cabinet.
3. Registrant data is not updated in real time
4. Data entry from applicants is done manually by Disdikpora staff
5. Selection is done manually through the archive file that has been collected.
6. Decision-making results of selection require time.

Based on the identification of the problem, it can be determined that the Disdikpora Karawang scholarship management information system must have the following features:

1. Online scholarship registration with file upload feature,
2. Selection of online registrant files ranking based on the registrant's grades and achievements
3. Online exams
4. Online scholarship announcements

Figure 2. Data flow diagram level 0

Figure 2. Modeling Data Flow Diagrams (DFD) of the Disdikpora Karawang scholarship management information system

DFD design pattern illustrates that in the system there are two entities namely admin and scholarship applicants or students. From the student entity, there is a student data flow and registration file that enters the system, while the data flow coming out of the system to the student is the student selection announcement data. From the admin entity, there is a registrant and file data flow from the system, while the data flow from the admin to the system is the result of selection data.

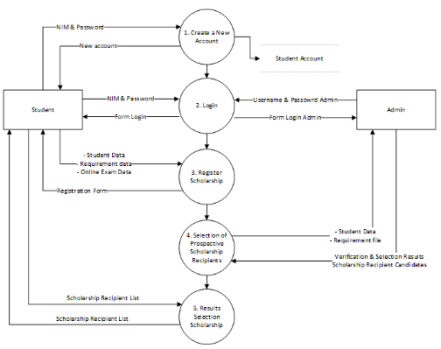

Figure 3. Data Flow Diagram level 1

In this data flow diagram level one in **Figure 3.**, it is divided into five processes, i.e. new account management, permisson access process, scholarship registration, scholarship recipient selection and selection results. OOP modeling can be described in terms of use case diagram, class diagrams and system mockups.

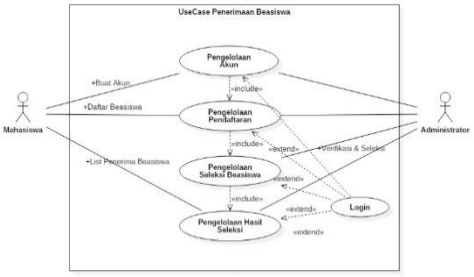

Figure 4. Use case general information management system of Karawang Disdikpora scholarship

In the general use case diagram, there are two actors namely students and administrators, from Figure 4 showing modules or features that can be accessed by actors from the Karawang Disdikpora scholarship management information system. Student actors can access account management to create accounts. Student chords can also use the registration management feature to register for scholarships, and can also use the management of the selection results to view the list of recipients of student selection. While the administrator actor can use all the features of account management, registration management, selection management, and scholarship selection management results. To be able to describe the database of the scholarship management information system, the researcher makes a model class diagram pattern as follows:

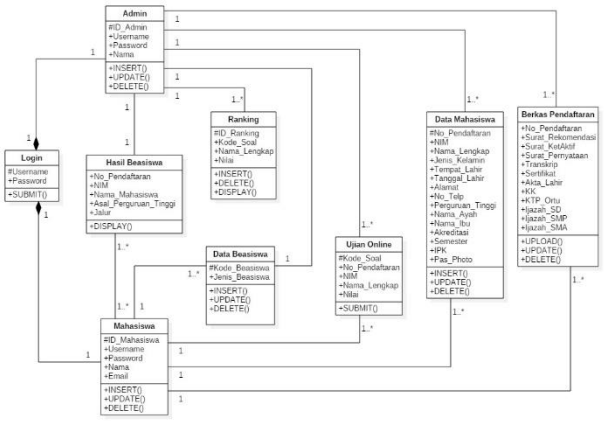

Figure 5. Class Diagram of management

Information system of Karawang Disdikpora scholarship

To further clarify the design of the inputs and outputs of the Karawang Disdikpora scholarship management information system, researchers made the mockup design as follows.

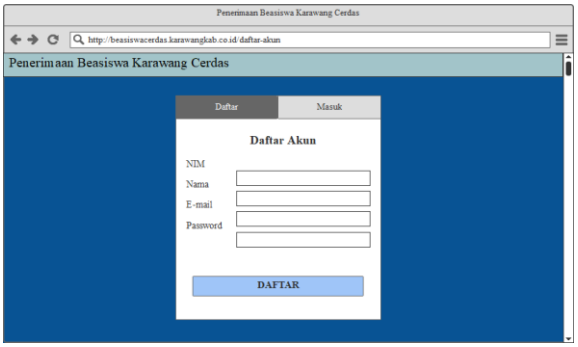

Figure 6. Display Account List

Figure 6. shows the form for creating a scholarship applicant account from the Karawang Disdikpora scholarship information system. In the account registration process, prospective applicants are asked to fill in the student ID number, name, email, and password. After the data is filled, prospective applicants can choose the list menu, to continue the account creation process. If the account creation is successful, prospective applicants will get verified via email.

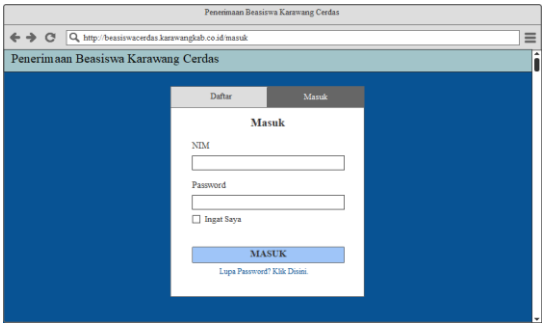

Figure 7. Display Login

Figure 7. shows a page for logging in Karawang Disdikpora scholarship applicants, who already have an account. If the potential registrant forgets the password, they can select the forget password menu below the login button. To enter the dashboard, prospective applicants are required to enter the user and password that they have when registering their account. If there are problems, prospective applicants can contact the helpdesk provided by Karawang Disdikpora.

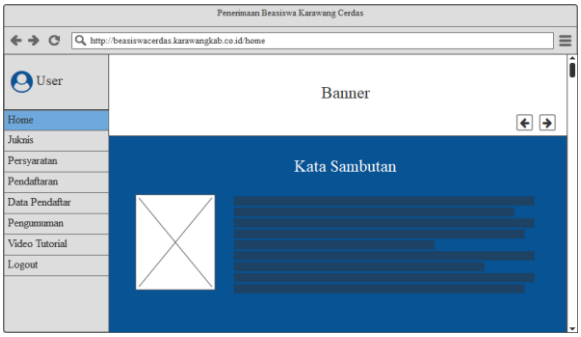

Figure 8. Display Home

Figure 8. shows the dashboard that will appear when a successful applicant logs in. On this page, there are several menus namely the homepage, technical instructions, requirements, registration, applicant's data, announcements, video tutorials, and logouts. all available menus have a function to guide prospective scholarship applicants in the registration process and help to monitor if there is a lack of requirements. In addition, there is also an announcement menu showing the results of applicants who have passed the Karawang Diskdikpora scholarship selection.

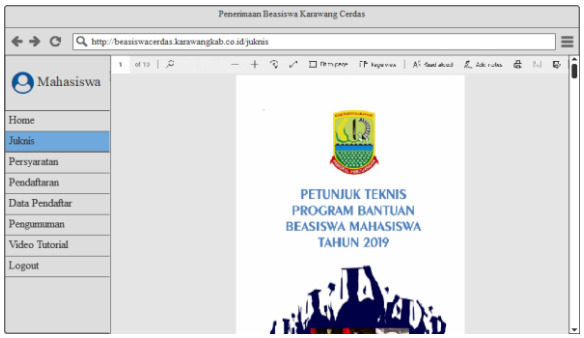

Figure 9. Technical Manual Display

The technical guidance menu in **Figure 9.** helps prospective applicants to find out the procedures and processes that go through to apply for a scholarship.

Figure 10. Display Requirements

Figure 10. shows a page that provides information about the requirements that must be met before registering. If in the requirements information menu, there are things that are not understood by scholarship applicants, Disdikpora Karawang prepares customer service that is ready to help provide an explanation.

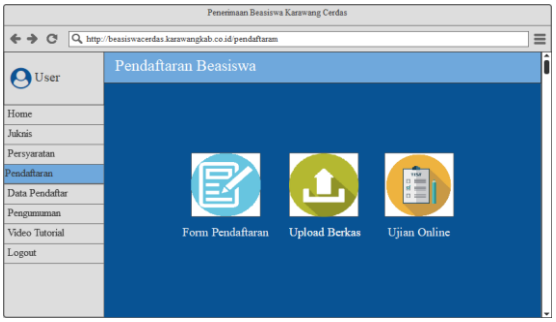

Figure 11. Registration Display

Figure 11. shows the page for registration. On this page, there are three menus, namely the forms for registration, uploading registration files and online exams. The registration form needs to be filled in by the registrant to find out his identity. File upload menu functions to attach supporting data or scholarship registration requirements. While the online exam menu will be active when the exam session has been opened.

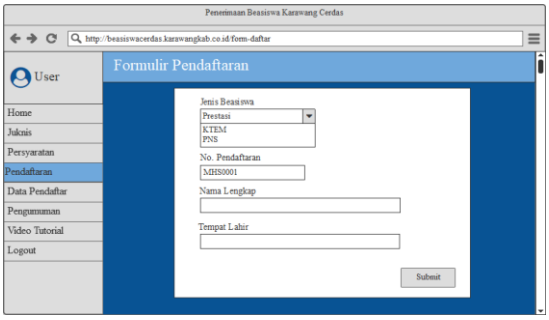

Figure 12. Display Registration Form

Figure 12. shows the registration form page. On this page, the applicants are asked to fill in the type of scholarship, full name and date of birth.

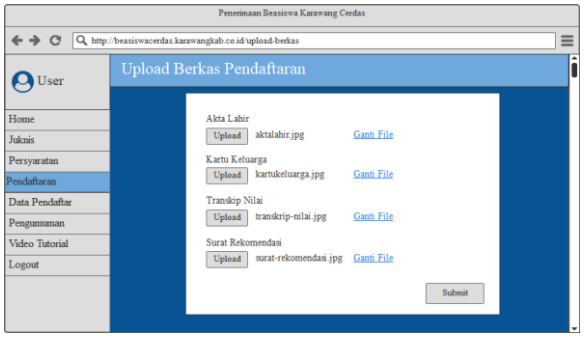

Figure 13. Display File Upload Form

Figure 13. shows the page for uploading files. The files uploaded are birth certificates, family cards, value transcripts and letters of recommendation from scholarship applicants.

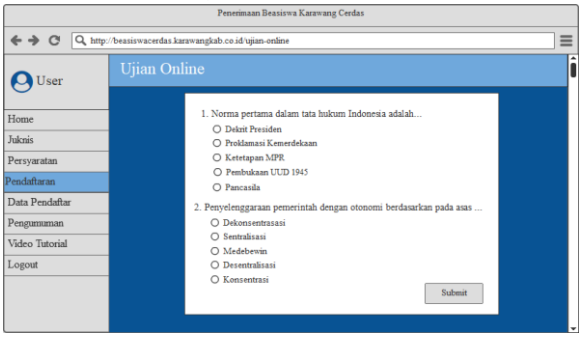

Figure 14. Display Exam Form

Figure 14. shows the page for the online exam. The form of an online exam held for the scholarship selection is in the form of multiple choice, the results of which can be directly known by the scholarship applicants.

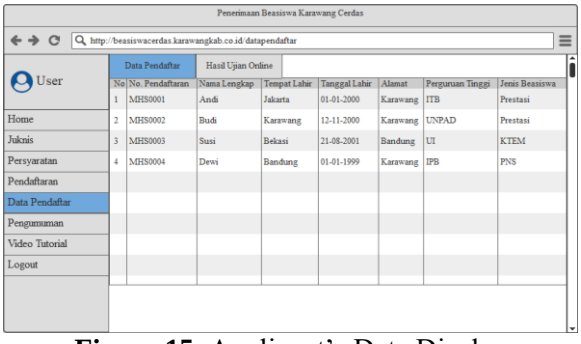

Figure 15. Applicant's Data Display

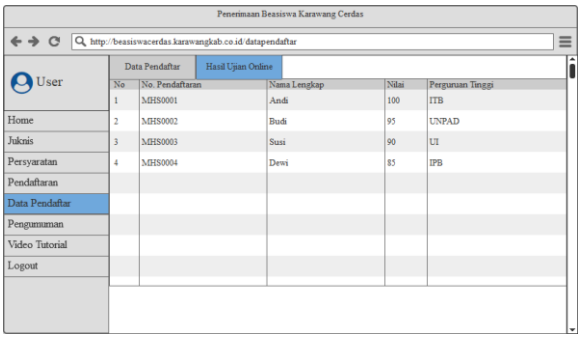

Figure 16. Display of Exam Results test online.

Figure 16. shows the data on the results of the Karawang Disdikpora scholarship selection

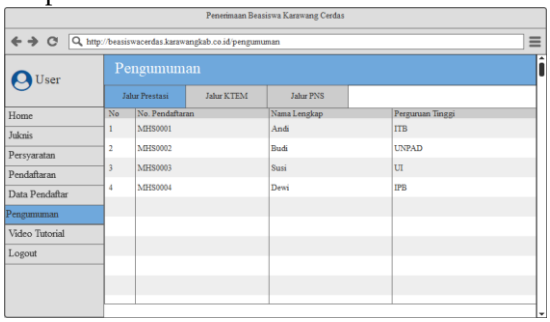

Figure 17. Announcement Display scholarship.

Figure 17. shows the announcement page of the winner of the Karawang Disdikpora

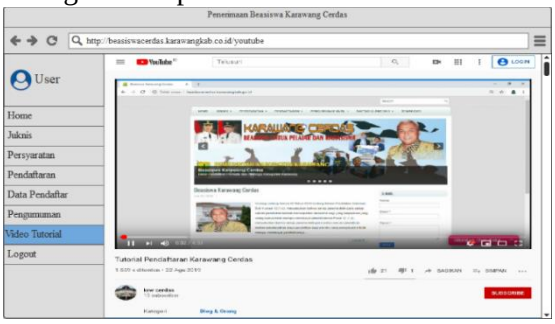

Figure 18. Video Display Registration Tutorial

Figure 18. shows a tutorial video page that can be played by scholarship applicants, to find out how and the process that is passed in the Disdikpora scholarship selection.

5. CONCLUSION

Based on the research results of the Karawang Disdikpora scholarship management information system research, it can be concluded that the modeling of information systems can combine two methodologies namely OOP and DFD. The results of the DFD design pattern in this system illustrate the flow of documents from the entity to the system while the OOP design pattern illustrates the interaction between actors or users with the scholarship management information system to be built. This design pattern can be a reference for Karawang Disdikpora in improving the effectiveness and efficiency of the scholarship selection operational process. This design can contribute to Disdikpora throughout Indonesia, to create transparency in the selection process. Subsequent studies can translate system design patterns into programming languages that are tailored to the needs of stakeholders.

REFERENCES

Darmawan, A. S. (2012). Pemilihan Beasiswa Bagi Mahasiswa Stmik Widya Pratama. *Jurnal Ilmiah ICTech*, *Vol. x*(1), 1–5.

Disdikpora. (2019). Tugas Pokok Dinas Pendidikan Kabupaten Karawang. Retrieved from Disdikpora website: http://disdikpora.karawangkab.go.id/artikel/t

ugas-pokok-dinas-pendidikan-kabupaten-karawang

Eniyati, S. (2011). Perancangan Sistem Pendukung Pengambilan Keputusan untuk Penerimaan Beasiswa dengan Metode SAW (Simple Additive Weighting). *Jurnal Teknologi Informasi DINAMIK*, *16*(2), 171–176.

Gómez Sotelo, K. I., Baron, C., Esteban, P., Estrada, C. Y. A. G., & Laredo Velázquez, L. de J. (2018). How to find non-functional requirements in system developments. *IFAC-PapersOnLine*, *51*(11), 1573–1578. https://doi.org/10.1016/j.ifacol.2018.08.272

Kirom, D. N., Bilfaqih, Y., & Effendie, R. (2012). Sistem Informasi Manajemen Beasiswa ITS Berbasis Sistem Pendukung Keputusan Menggunakan Analytical Hierarchy Process. *Jurnal Teknik ITS*, *1*(1), 1–6.

Marnewick, C. (2016). Benefits of information system projects: The tale of two countries. *International Journal of Project Management*, *34*(4), 748–760. https://doi.org/10.1016/j.ijproman.2015.03.016

Novrizal Eka Saputra,Ken Ditha Tania, R. I. H. (2016). PENERAPAN KNOWLEDGE MANAGEMENT SYSTEM (KMS) MENGGUNAKAN TEKNIK KNOWLEDGE DATA DISCOVERY (KDD) PADA PT PLN (PERSERO) WS2JB RAYON KAYU AGUNG. *Jurnal Sistem Informasi*, *8*(2), 1038–1055. https://doi.org/10.1017/CBO9781107415324.004

Nuraida, W., Hadi, S., & Rachmat, A. (2016). Perancangan Sistem Informasi Beasiswa Berbasis Website pada Fakultas Teknik Untirta. *Seminar Nasional IENACO 2016*, *1*(1), 236–243.

Riehle, D. (2015). *(12) United States Patent*. *2*(12).

Romadhoni, E. N. A., Widiyaningtyas, T., & Pujianto, U. (2015). Implementasi Model Waterfall Pada Pengembangan Sistem Informasi Alumni SMKN 1 Jenangan Ponorogo. *Seminar Nasional Sistem Informasi Indonesia*, (November), 445–452.

Safitri, S. T., & Supriyadi, D. (2015). Rancang Bangun Sistem Informasi Praktek Kerja Lapangan Berbasis Web dengan Metode Waterfall. *Jurnal Infotel*, *7*(1), 3–8.

Salman, A. G., Manalu, S. R., Chandra, N., & Gomis, A. P. (2015). Analysis and Design for Food Planning Mobile Application. *Procedia Computer Science*, *59*(Iccsci), 275–281. https://doi.org/10.1016/j.procs.2015.07.562

Umami, P., Abdillah, L. A., & Yadi, I. Z. (2014). *Sistem pendukung keputusan pemberian beasiswa bidik misi*. Retrieved from http://arxiv.org/abs/1402.7131

Veza, O. (2017). PERANCANGAN SISTEM INFORMASI INVENTORY DATA BARANG PADA PT.ANDALAS BERLIAN MOTORS (Studi Kasus : PT Andalas Berlian Motors Bukit Tinggi). *Jurnal Teknik Ibnu Sina (JT-IBSI)*, *2*(2), 121–134. https://doi.org/10.36352/jt-ibsi.v2i2.63